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Managing Supply Chain Service Value Risks - Organizational Roles and Social Connections

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ABSTRACT *Service networks are increasing in importance in international business whereas the risk management of those is still in its infancy. Service value provision is typically discussed only from the creation perspective rather than taking into account the risks involved, and how those are managed. In order to ensure the delivery of value, taking into account the risk management perspective is essential. To address this gap in the literature this study compares the differences in network connection importance between different roles and organizational levels in both service value creation and risk management of logistics sales services. Our findings suggest that understanding the characteristics and dynamics of network can provide crucial information for enabling efficient and effective implementation of value network.*

Keywords: Supply chain management, Networks, Logistics, Operations management, Service industries, Operations improvement, E-business

RISK MANAGEMENT PERSPECTIVE TO NETWORK VALUE CREATION

The focus on the network and supply chain perspectives of value, has mainly concentrated on traditional manufacturing rather than services. Several authors have discussed about the differing natures between products and services (e.g. Vilko and Ritala, 2014; Sampson and Spring, 2012; Niranja and Weaver, 2011; Sengupta et al., 2006) and the calls for more research since a decade ago have received only little attention (e.g. Ellram et al., 2004; Demirkan and Cheng, 2008). Risks especially are taking the attention of several actors in the field as supply chain disruptions have become a critical issue for many companies.

The logistic operations are getting divided between an increasing number of operators, organizational responsibilities relating to risk management are becoming hazier. The ability to identify risks decreases as the visibility of the supply chain diminishes beyond the organization's own functions (Vilko et al.,

2016). The risks and their visibility and impact depend on the position of the companies in the supply chain and on the level of analysis they are able to carry out. Events that affect one supply chain entity or process may interrupt the operations of other supply chain members. In a service value network this means that the right connections must work in risk event to ensure the undisrupted production of value to the customer.

The customer demands for service value are increasing. In logistics, the demands for better performance, higher on-time delivery performance, and reduced damage-in-transit, require a high level of flexibility and ability to adapt to changes. Considering that the functions in the service supply chains are also highly dispersed among outside service providers, companies' dependency on the right network connections is crucial. A good example of how vulnerable the value provision in supply chains can be seen from the study of Hencricks et al. (2009) where companies admitting to major supply-chain difficulties lost 10 percent of their shareholder value on average.

It is thus obvious that further information about networked value creation is needed, especially from the supply chain risk management perspective. Therefore, the purpose of this study is to *analyze the value production process of logistics service sales from network perspective*. More precisely, a social network analysis is conducted to illustrate both the hierarchical and social relationships and roles of different actors in logistics service network. The study is based on the existing literature on supply chain risk management and the findings of case study of a newly launched logistics services sales process.

SUPPLY CHAIN RISK MANAGEMENT AND VALUE PRODUCTION

The importance of recognizing the attributes related to logistics service value have been discussed in the scientific literature for two decades (e.g. Mentzer et al. 1997), however the network perspective of the value creation has been received attention only more recently (e.g. Yazdanparast et al. 2010; Lusch et al. 2010). Service value networks comprise from consumers, service providers, multi-tier and auxiliary enabler, and the network perspective of these is identified as one of the most challenging aspects to service systems (Basole and Rouse, 2008). The recent contributions in logistics field, scholar

have presented some visions of the service value networks (see e.g. Bose et al. 2014), links to the know philosophies and measurements of service value to logistics (see. e.g. Chao and Anantana, 2014).

The limited amount of work that considers the service nature of supply chains has defined service supply chain management to include the management of information, processes, capacity, service performance and funds from the earliest supplier to the ultimate customer (e.g. Ellram et al., 2004; Baltacioglu et al., 2007). The management models used for traditional manufacturing supply chains do not necessarily work well on services. More importantly for our case, even less work has been done to investigate service supply chain risk management.

The benefits of taking into special nature services have been argued to provide, for example, better coordination of processes, improved performance through process integration and improvement of the customer interface (Giannakis, 2011). Considering the distinctive attributes of services, namely intangibility, heterogeneity, inseparability of production and consumption, and perishability (see e.g. Vilko & Ritala, 2014, Zeithaml et al., 1985; Fitzsimmons & Fitzsimmons, 2000; Nijssen et al., 2006) it is no wonder that scholars have highlighted the importance of differentiating the tasks in service supply chain management (Arlbjørn et al. 2011). According to Cho et al. (2012) this can be done through different types of relationships between the supply chain actors.

RESEARCH DESIGN

The qualitative and explorative case research approach was considered appropriate to gain theoretical and empirical insight into the topic because it had received only limited research attention in the past (Yin, 2008). The case study form was considered well-founded in serving the information-oriented focus of the research and discovering causalities of the phenomenon (Yin, 2008, Jensen and Rodgers, 2001).

The empirical part of the study is based on the empirical data mainly received from the interviews and the questionnaire. The experience and insights of the executive and managerial level informants were

utilized to build up the case study process and to identify the relevant actor roles in creating customer value in the service network. The knowledge of the informants was considered essential to make in-depth sense of the phenomena (Eisenhardt, 1989), as the experiences and first-hand knowledge of the value creation in the case were the base for the study. The informants interviewed were selected on the basis of their knowledge about the value network. The research process is illustrated in Figure 1.

Insert Figure 1 about here

The goal of this case study was to describe and compare the importance of communication between known actors in the supply chain during the normal and risk situations. Each network node is referring to an individual people, which have different roles and hierarchical status within the network. The special interest was on individual actors role regardless their formal hierarchical status. By utilizing social network analysis (SNA) method (Wasserman and Faust 1994), each actor within our case company example was asked to evaluate the perceived importance of communication between other known actors in the network. The proper selection of network questions and scale is a critical success factor to all network studies (Borgatti et al. 2013, p. 45).

The perceived importance of communication was measured similarly to Six Sigma approach. More precisely the connection importance scale ranged from 0 to 9 where 0 denotes not relevant connection, 1 denotes a weak connection, 3 denotes a somewhat important connection and 9 denoted highly important connection. To avoid recall errors (Johnson et al. 2003), the closed-ended question format was used and a roster of actors was presented to respondents, asking them to evaluate the other supply chain actors with the respect of their importance on communication issues. The roster of actors included eleven individual actors and seven different roles. Although some of the actors had similar job title such as product captain, their actual job description and formal status with the organization hierarchy was varying as presented in Table 1.

Insert Table 1 about here

NETWORK CONNECTIONS ANALYSIS

The analysis for the study was conducted in two separate phases: First, the network process was discovered, recorded and verified based on the personal interviews. Second phase of the process was the social network analysis of the actor roles and hierarchical teams'.

In the first phase, the initial investigation of the process revealed how the organization's customer interface occurred by three different methods, namely telephone, Internet and email. While this case concentrated on the on the logistics services sales process through the organizations newly launched Internet platform also the email and telephone connections played an important role – especially in the events of risk realization. A simplification of the case process is illustrated in Figure 2.

Insert Figure 2 about here

Service value network connections analysis

Based on the survey results, the connections between the actors were analysed in two different occasions. Firstly, a normal value creation scenario was used where the actors evaluated the importance of their connections within the network. The analysis revealed that the actors had clear differences in how they saw the importance of the network connections. Secondly, the analysis concentrated on the event of risk realization in the service value network process, where the important connections in the network seemed to lessen. This was seen for example by the lessening number of the connections that the respondents considered as highly important. The network structure changed to a bit denser form as some of the connections lose their importance and overall it can be noticed that even though the network connections importance lessens cumulatively, some of the network roles see the importance of the connections growing.

To show the dynamics between the normal and risk situation connections in Table 2 illustrates the changes between individual connections. It is important to notice that the table does not distinguish if direction of the change in the importance, but only the change in strength. The right hand column of the table illustrate the average result of how the respondents evaluated the importance of their own connections to the network, where as the last row of the table illustrates the importance evaluated by

other actors in the network of the connection to the respondent. The table role codes are presented in Table 1 previously. It can be noticed that for example in the role of PC 1's connections importance lessens for most of the other roles while to PC3 and to PM they remain as equally important compared to the normal value production. Also the difference of perspective is clearly visible in the differences of role PC 3: Where PC 3 sees the importance of his connections weakening other actors of the network do not report a great difference in their connections to PC 3.

Insert Tables 2 about here

Social network analysis

The second part of the connections analysis included the illustrative social network mapping. A visual presentation of the network connections was considered a good way to illustrate the dynamics of the network connections. For the network analysis the response rate of the questionnaire (60%), required special measures to improve the quality of the results. The missing data creates a row of missing values in the network adjacency matrix. This is a problem when illustrating the connections between network actors. Many SNA procedures which are derived from graph-theory are treating the missing values as non-ties, which is an incorrect interpretation (Borgatti et al. 2013, p. 73). In SNA methodology there are multiple options to manipulate missing data including deleting those node altogether from analysis, and filling the missing row data from corresponding column when possible. The dichotomizing and symmetrizing of data process was utilized (Borgatti et al. 2013, p. 77).

The normal and risk matrixes were first dichotomized by setting threshold value to 9 (Highly important connection). All the cells that passed the threshold value were set to 1 indicating relationship between actors, while setting the remaining cells to 0 (i.e. no relationship). Next, the both matrixes were symmetrized by utilizing union rule and taking the larger of the two entries. This procedure helps to fill out some of the missing data by assuming that all ties reciprocated and undirected. An illustration how the network connection changes between a risk situation and in a normal situation and in case of a risk event can be seen from the Figure 3. Those actor's nodes who responded to our survey, are indicated by gray colored square, whereas non-responded actor nodes are indicated by red colored triangles.

Insert Figure 3 about here

When normal and risk management networks are compared, it appears that in risk management situations, some of the actors are decreasing their communication relationships whereas some are keeping all their relationships. For example PC 1 who is a sales director and a member of management team, is reducing his/hers connection from 8 to 3. Instead manager NBSS who is a member of management team and responsible for customer solutions and systems, is keeping all his/hers relationships.

In order to evaluate the communication difference between normal and risk management situations, the averaged normal situation connection matrix was subtracted from averaged risk management situation connection matrix. In practice if the resulted averaged connection matrix cell value is positive, it indicates that communication during the risk management situation is more important than in the normal situation, whereas averaged negative values indicate less important communication during the risk management situation. In Table 3, we have presented the subtracted and averaged matrix (i.e. averaged risk management – averaged normal situation). In Figure 4 the dynamics of the value risk management between hierarchies are visualized. In the figure the weighted red lines indicate decreasing communication while the weighted blue lines indicate increasing communication.

Insert Table 3 about here

Insert Figure 4 about here

When averaged normal and risk management networks are compared, it appears that in risk management situations, the perceived communication importance is decreasing in the seven out of nine relationships. Only in case of two relationships (executive team – managerial team and managerial team – interregional management), the communication was perceived more important during the risk management situation. Interestingly, only executive team perceives that lesser important communication with the customer during the risk management situation, whereas managerial team and both operative level (sales and technical) is keeping status quo with the customer(s). Moreover, since

higher hierarchies (i.e. executive team – managerial team and managerial team – interregional management) are deepening their communication in risk situation, this indicates top-down risk management process in which the higher management is taking the control and leading the risk management situation.

CONCLUSIONS

Service value networks' profitability depends on its actors' collaborative ability to identify and mitigate the risks that they face. The more the complexity of the network increases, the more they require to identify the relevant connections between the roles to ensure an undisrupted flow of value (Mentzer 2001). Although the awareness of supply chain vulnerability and risk management has increased among practitioners during the last decades, many of related concepts are still in their infancy and there is a lack of conceptual frameworks and empirical findings to provide a clear meaning of the phenomenon of supply chain risk management (Jüttner 2005; Manuj & Mentzer 2008). In their studies Harland et al. (2003) came to the conclusion that in the supply chains examined, less than 50% of the risk was visible to the focal company.

In this paper, we analysed the logistics sales processes in two scenarios, namely in a normal situation where the service value is being delivered and in an event of risk realization. We studied the importance on different roles, teams and their connection dynamics to gain insights on the dynamics of these. The study has both theoretical and managerial implications which are discussed below.

The theoretical implications

The theoretical implications of this study can be considered threefold. Firstly, the service supply chain management should be understood as a network which both creates and protects the value. While most of the academic studies encompassing service value have so far failed to take into account the inherent vulnerability of the value, this study takes more holistic approach to value production by looking both the production and protection of the value. Because services are by their nature more challenging to manage compared to traditional products the understanding of the vulnerability aspects is essential.

Secondly, our research takes into account network nature of service system and helps to form a comprehensive picture about the links which are essential in different levels in both creating the value and managing the risk against it. Scholars have found social network analysis to be an appropriate way to investigate supply chains (e.g. Borgatti and Li, 2009, Kim et al. 2011), however it is still little used for studying the formation or protection of value in service supply chains. The method seemed to work well for studying the network nature in different levels and thus our study confirms the results of earlier studies and further adds that it works well in studying different scenarios and aspects.

Finally, the results of this study imply that different network members have different opinions about the importance of their connections. As such this confirms the results of previous network analysis research. Our findings also suggest that in risk management situations, the top-down risk management process is taking control and the higher management is leading the risk management situation. Interestingly, during this transformation which should ensure undisrupted production of value to the customer, the executive team perceives that it is lesser important communication with the customer during this particular situation. As a result discovering the causalities behind these differences as well as the impact to customer value perceptions should be further investigated in the future research.

Managerial implications

The results of this study enhance the practitioners' awareness on the nature of connectivity that is needed in the service networks in order to ensure the delivery of value. The results of the study reveal that in a risk situations, the connection priorities change and number of the most important connections is reduced. By taking this into account the service network connections practitioners can improve understanding of what is required to manage the value in the service networks in the most efficient way. The findings indicates that in risk situation there is high likelihood that customers will experience lesser contacting due the transformation to top-down management model. This could actually weakening instead of improving the "service provider – customer" interface and therefore make recovering to normal situation more challenging. Typically communication and image repair theories suggested that organizations should protect their reputation by quickly responding to the abnormal situations. As a

result a careful attention should be given to ensure prompt, accurate and consistent information to the customers in risk situations.

Limitations and future research

This study has obvious limitations due to its case research design. Further research is needed to develop explicit methods for analyzing the causalities behind the phenomenon. The fact that the empirical part of the study relies on the two informants' interviews and that the SNA questionnaire had 60% response rate do oppose some limitations in terms of generalizability and furthermore includes risks in misjudging the representativeness of the case. Future research should be conducted with more complete data in different cases in order to gain more evidence on the phenomenon.

REFERENCES

Arlbjørn, J. S., Freytag, P. V., and de Haas, H. 2011, Service supply chain management: A survey of lean application in the municipal sector. International Journal of Physical Distribution and Logistics Management, Vol. 41 No. 3, pp. 277–295.

Baltacioglu, T., Ada, E., Kaplan, M. D., Yurt, O., and Kaplan, Y. C. 2007, A new framework for service supply chains. The Service Industries Journal, Vol. 27, No. 2, pp. 105–124.

Basole, R. and Rouse, W. 2008, Complexity of service value networks: conceptualization and empirical investigation, IBM systems journal, Vol. 47, No. 1, pp. 53-70.

Borgatti, S. P., and Li, X. 2009. On social network analysis in a supply chain context*. Journal of Supply Chain Management, Vol. 45, No. 2, pp. 5-22.

Borgatti, S. P., Everett, M. G., and Johnson, J. C. 2013. Analyzing social networks. SAGE Publications Limited.

Bose, J. W., Jahn, C., and Sarin, R. 2014. Vision of a Service Value Network in Maritime Container Logistics. Next Generation Supply Chains: Trends and Opportunities, 87.

Chao, P., and Anantana, T. 2014. The Impact of Guanxi on Logistics Service Value, CMU Journal of Natural Science Vol. 13, No. 1, pp. 87-98.

Eisenhardt, K. M. 1989, "Building theories from case study research", The Academy of Management Review, Vol. 14, No. 4, pp. 532-550.

Ellram, L., Tate, W., and Billington, C. 2004, Understanding and managing the services supply chain. Journal of Supply Chain Management, Vol. 40, No. 4, pp. 17–32.

Ellram, L., Tate, W., and Billington, C. 2007, Services supply management: The next frontier for improved organisational performance. California Management Review, 494, pp. 44–66.

Fitzsimmons, J. A., and Fitzsimmons, M. J. 2000, New Service Development: Creating Memorable Experiences, Sage, Thousand Oaks, CA.

Giannakis, M. 2011, Management of service supply chains with a service oriented reference model: The case of management consulting source. Supply Chain Management: An International Journal, Vol. 165, pp. 346–361.

Harland, C., Brenchley, R., and Walker, H. 2003. Risk in supply networks. Journal of Purchasing and Supply managementI Vol. 92, pp. 51-62.

Hendricks, K., Singhal, V., and Zhang, R. 2009, The effect of operational slack diversification, and vertical relatedness on the stock market reaction to supply chain disruptions. Journal of Operations Management, Vol. 273, pp. 233–246.

Jensen, J. L. and Rodgers, R. 2001, "Cumulating the intellectual gold of case study research", Public Administration Review, Vol. 61, No. 2, pp. 235-260.

Johnson, J. C., Boster, J. S., and Palinkas, L. A. 2003. Social roles and the evolution of networks in extreme and isolated environments. Journal of Mathematical Sociology, Vol. 272, No. 3, pp. 89-121.

Jüttner, U. 2005. Supply chain risk management: Understanding the business requirements from a practitioner perspective. The International Journal of Logistics Management, Vol. 161, pp. 120-141.

Kim, Y., Choi, T. Y., Yan, T., and Dooley, K. 2011. Structural investigation of supply networks: A social network analysis approach. Journal of Operations Management, Vol. 293, pp. 194-211

Lusch, R., Vargo, S. and Tanniru, M. 2010, Service, value networks and learning, Journal of the academy of Marketing Science, Vol. 38, pp. 19-31.

Manuj, I., and Mentzer, J. T. 2008. Global supply chain risk management. Journal of Business Logistics, Vol. 291, pp. 133-155.

Mentzer, J., Rutner, S. and Matsuno, K. 1997, Application of the means-end value hierarchy model to understanding logistics service value, International Journal of Physical Distribution and Logistics Management Vol. 27, No. 9/10, pp. 630-643.

Nijssen, E. J., Hillebrand, B., Vermeulen, P. A. M., and Kemp, R. G. M. 2006, Exploring product and service innovation similarities and differences. International Journal of Research in Marketing, 23, pp. 241–251.

Sampson, S. E., and Spring, M. 2012, Customer roles in service supply chains and opportunities for innovation. Journal of Supply Chain Management, Vol. 48, pp. 30–50.

Sengupta, K., Heiser, D., and Cook, L. L. 2006, Manufacturing and service supply chain performance: A comparative analysis. Journal of Supply Chain Management, Vol. 424, pp. 4-15.

Vilko, J. and Ritala, P. 2014 Service supply chain risk management, Operations and Supply Chain Management: An International Journal, Vol. 7, No. 3. pp. 114-120.

Vilko, J., Ritala, P. and Hallikas, J. (2016) Risk management abilities in multimodal maritime supply chains: Visibility and control perspectives, Accident Analysis & Prevention.

Keywords: Maritime supply chain; Risk management ability; Port; Multimodal; Visibility; Control

Wasserman, S. and K. Faust 1994. Social Network Analysis: Methods and Applications. Cambridge: Cambridge University Press.

Yazdanparast, A., Manuj, I. and Swartz, S. 2010 Co-creating logistics value: a service-dominant logic perspective, International Journal of Logistics Management, Vol. 21 No. 3, pp.375 – 403.

Yin, R. 2008, Case Study Research: Design and Methods, 5th edn, SAGE Publications, Beverly Hills, Califonia.

Zeithaml, V. A., Parasuraman, A., and Berry, L. L. 1985, Problems and strategies in services marketing strategies. Journal of Marketing, Vol. 49, Spring, pp. 33-46002E

Figure 1: Research process

Table 1: Case company actor profiles

Actor	Code	Role in case process	Hierarchical status	Response
Product Captain 1	PC 1	Sales director	Executive team	Yes
Product Captain 2	PC 2	Technical support	Operative (tech.)	No
Product Captain 3	PC 3	Freight manager	Management team	Yes
Product Captain 4	PC 4	Technical support	Operative (tech.)	Yes
Product and Freight Manager	PFM	Regional manager	Inter-regional management team	No
Product Manager	PM	Customer information manager	Operational (sales)	Yes
Sales Manager 1	SM 1	Sales	Operational (sales)	Yes
Sales Manager 2	SM 2	Sales	Operational (sales)	No
Key Account Manager	KAM	Sales	Operational (sales)	No
Manager NBSS	M NBSS	Customer solutions manager	Management team	Yes
Customer	C	Service purchaser	Customer	No

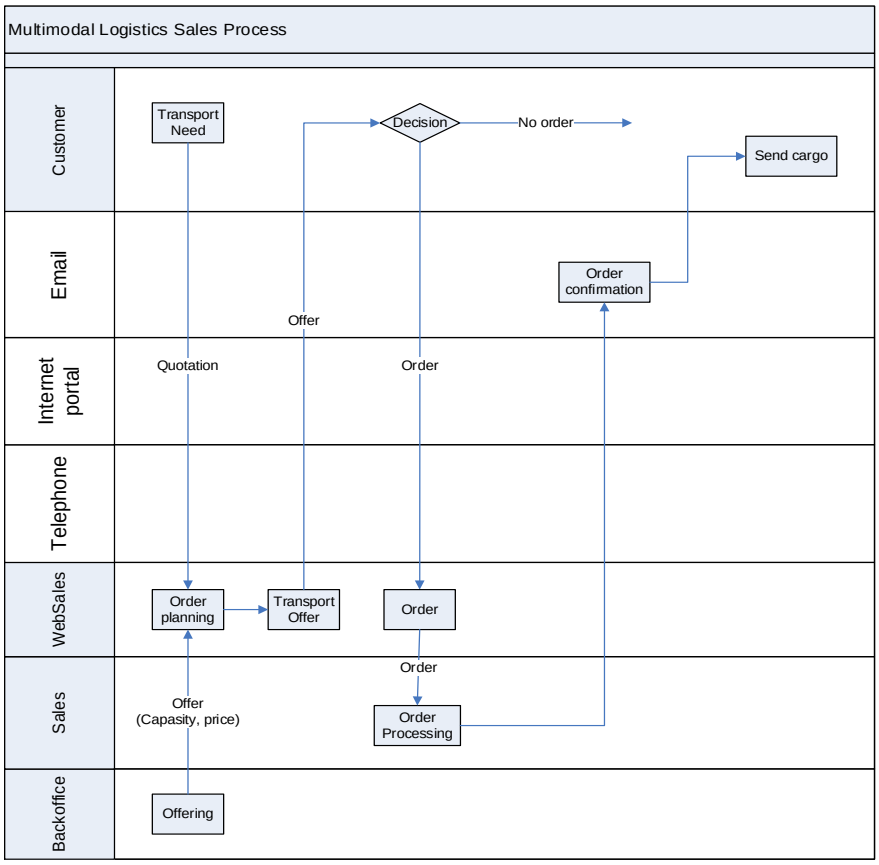

Figure 2: Illustarion of the value process

Table 2: Importance of service value network connection in risk events

	PC 1	PC 2	PC 3	PC 4	PFM	PM	SM 1	SM 2	KAM	M NBSS	C	AVG	%
PC 1	0	3	0	3	6	0	6	6	6	3	6	39	43.3
PC 3	0	4	0	2	0	1	6	6	0	1	0	20	22.2
PC 4	6	0	0	0	0	2	2	0	0	1	0	11	12.2
PM	2	2	2	2	0	0	0	0	0	0	0	8	8.9
SM 1	0	0	0	0	1	0	0	0	1	0	0	2	2.2
M NBSS	0	0	0	0	6	0	2	0	2	0	0	10	11.1
AVG	8	9	2	7	13	3	16	12	9	5	6		
%	8.9	10.0	2.2	7.8	14.4	3.3	17.8	13.3	10.0	5.6	6.7	100	

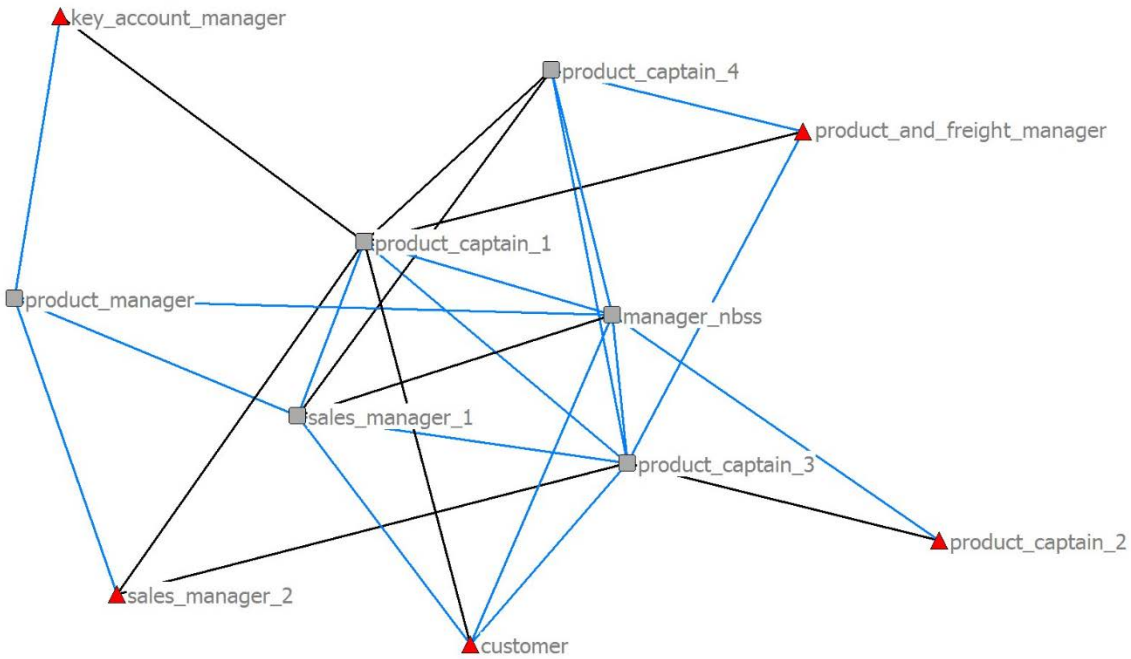

Figure 3: Normal and Risk situation relationships

Table 3: Roles and hierarchical status of teams

	Executive team	Managerial team	Operative (tech)	Inter-Regional Management	Operative (Sales)	Customer
Executive team	0	0.83	-.667	-2.83	-1.63	-3
Managerial team	0.83	0	-1.083	1.50	-0.54	0
Operative (tech)	-1.67	-1.08	0	0	0	0
Inter-Regional Management	-2.83	1.50	0	0	-0.33	0
Operative (Sales)	-1.63	-0.54	0	-0.33	0	0
Customer	-3	0	0	0	0	0

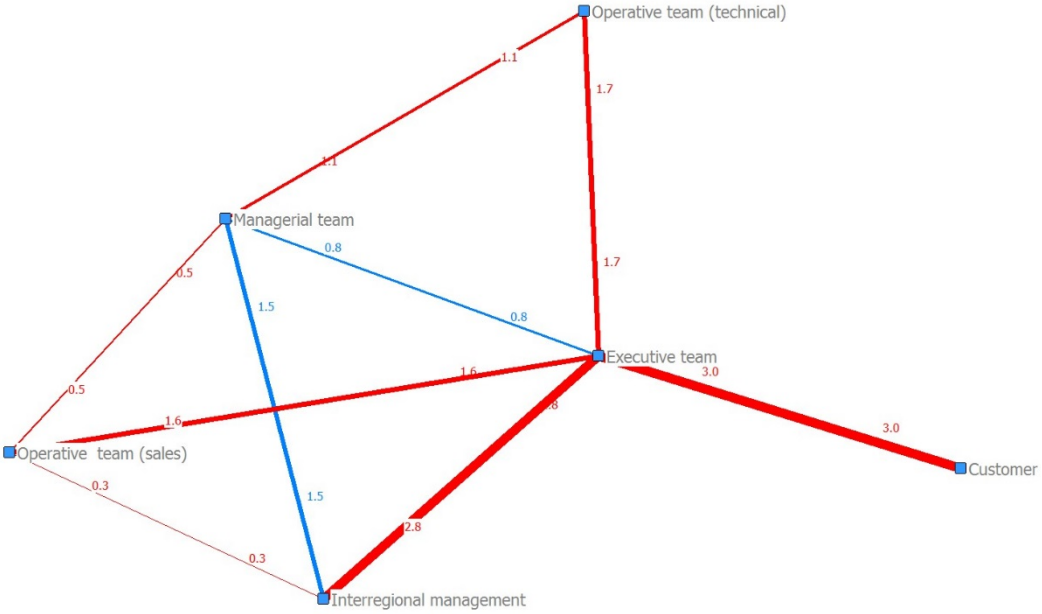

Figure 4: Dynamics of the value risk management between hierarchical teams